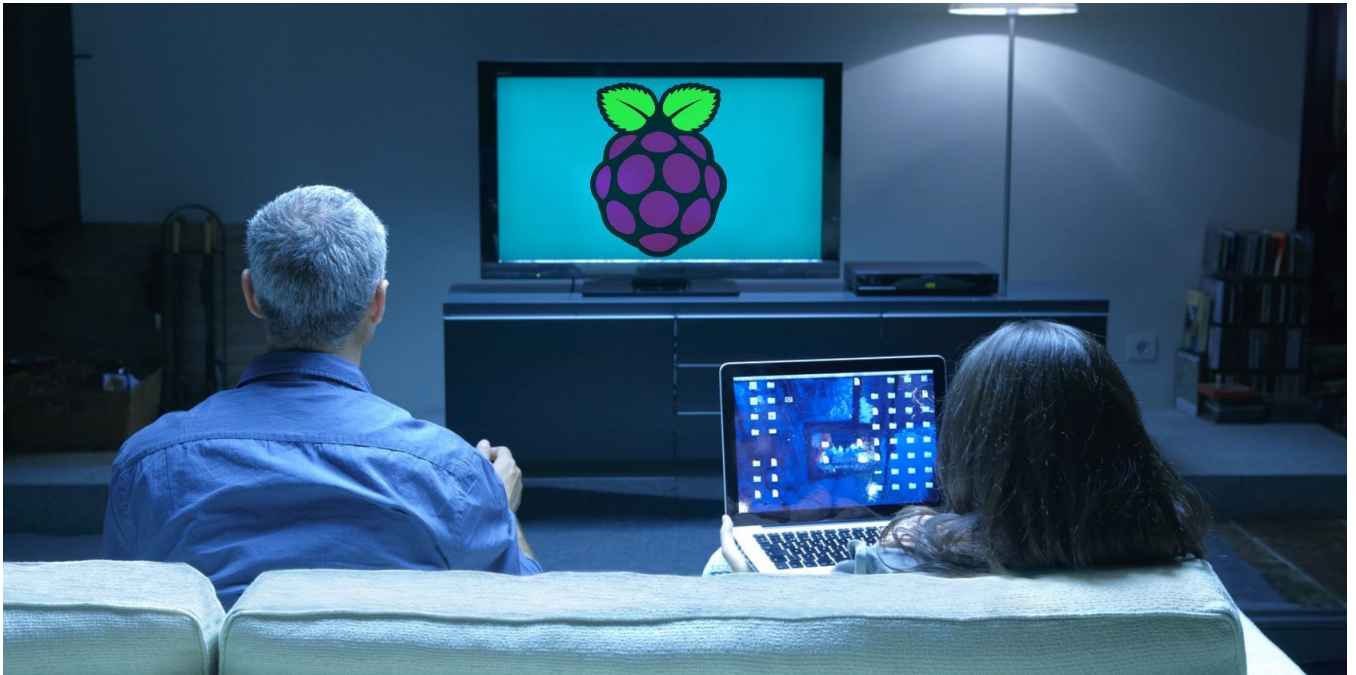# 5 Ways to Display Your Raspberry Pi On a Monitor Or TV

Back in the 1980s and 1990s, home computers didn't rely on dedicated monitors to display operating systems, applications and games. In those days, things were far simpler. Instead of paying extra for a monitor, the majority of home computer and console owners were happy to use their televisions. It might seem odd now, but 30 years ago people thought little of ignoring TV programs to play video games.

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For some, the situation hasn't changed all that much, with games consoles often connected to the family TV. But as far as computers go, the PC model of a dedicated monitor was eventually widely adopted. It would be unusual to see a home PC connected to a television, even if it isn't impossible.

If you think about it though, the option to connect to different types of display unit is pretty flexible. This must surely have been in the minds of the Raspberry Pi developers when they were deciding upon how their users might use the computer.

Despite its modest dimensions, the Raspberry Pi supports 5 methods of hardware display output, enough to cover pretty much any output device you can think of.

What the Creators Say...

When I spoke to Raspberry Pi Foundation co-founder Eben Upton following the Pi's launch, he explained that the stripped-down computer was borne from the spirit of the 8-bit era.

"It's a very cheap Linux PC, device in the spirit of the 1980s, a device which turns your TV into a computer, plug in to TV, plug a mouse and a keyboard in, give it some power and some kind of storage, an operating system and you've got a PC."

Several different connections are supported from the Raspberry Pi. The original device features HDMI and RCA, while the most recent model, the Raspberry Pi 3, has only the HDMI and the magical 3.5 mm media port.

So how do you use these connectors to hook your Raspberry Pi to a monitor or TV?

It's Got HDMI!

One of the most exciting things about the Raspberry Pi is that each version comes equipped with a HDMI connector, meaning that anyone with a HDMI-compatible TV (which is the majority of people in North America and Europe) can easily connect the device to their living room television.

Along with the SD card and power supply, the HDMI cable is one of the most important pieces of equipment that you can use with your Raspberry Pi, which means that in theory you can connect it to a wide selection of televisions and even modern desktop computer monitors.

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HDMI is ubiquitous, available on the original Raspberry Pi, the Model B revisions, the Raspberry Pi 2, and the Raspberry Pi 3. It is also present on the Pi Zero, although you'll need a mini HDMI adaptor to use HDMI here.

Sadly, not all televisions and monitors have HDMI connectors.

Using a HDMI to VGA Adaptor

In the event that your chosen display unit doesn't have an HDMI connector, the first thing you should do is check whether or not it has a VGA connector – the D-shaped connector that has been commonly found on computer monitors for the past 20 odd years. If your monitor is VGA-compatible, then all you will need is a HDMI to VGA adaptor in order to use your Raspberry Pi with that device or cable type.

You'll also need to make a small change to the **config.txt** file that Raspberry Pi uses when it boots.

Using a memory card reader on your desktop computer, insert the Raspberry Pi SD card and open config.txt in your preferred text editor.

Look for the following lines:

```
#hdmi_force_hotplug=1 #hdmi_drive=2
```

Both options need to be enabled, which you can do by removing the hash symbol and saving. These options enable VGA output through an HDMI adaptor and sets the screen resolution to a low 640 x 480.

If you want a higher resolution, remove the hash symbols from the following lines:

```
#hdmi_group=1 #hdmi_mode=4
```

You will also need to edit these two lines, changing

```
#hdmi_group=1
```

to

```
#hdmi_group=2
```

and

```
#hdmi_mode=4
```

to

```
#hdmi_mode=16.
```

Remember to save your changes before safely removing and replacing in your Raspberry Pi.

Display Output Using RCA

On the original A and B Raspberry Pis, through to the Model B+ (2014), a third option for displaying output exists -- the RCA connector. This is found on the opposite side of the device to the HDMI port, just next to the audio port.

Using a standard RCA composite cable you can connect your Raspberry Pi to any compatible TV (if it doesn't have HDMI, it almost certainly has a yellow RCA or a SCART socket), and enjoy video output. Note that as soon as an HDMI cable is connected the Pi will switch to that output. RCA can also be switched to SCART with a suitable adaptor, useful if your display has neither RCA, VGA or HDMI connectors.

Depending on your screen resolution, you may need to alter the way in which the Raspberry Pi displays windows. This will affect you if the monitor has a low resolution, but by changing the overscan settings

in config.txt you can configure the video output to suit your monitor.

Out of Options? Try the 3.5mm TRRS Connector

Finally, the Raspberry Pi has a barely-used secret. Since the Raspberry Pi Model B+, it has wielded an almost-magic 3.5 mm media port. Capable of handling both video and audio, you can use a breakout cable in the TRRS port to connect up to standard RCA connectors. You'll find one of these at ModMyPi or Amazon for just a few dollars.

TRRS is a cheaper and more power efficient port than the old standard RCA connector, which is why it is now found on Raspberry Pi Model B-type boards. Don't overlook this option!

Display DSI Ribbon Connector

Raspberry Pi devices from the Model A to the Raspberry Pi 3 Model B include a ribbon connector, the Display DSI port. This is intended to connect to a dedicated Raspberry Pi display, standard and touchscreen.